

AMENDMENT TO THE DRAWINGS

Please replace sheet 8 (Fig. 4) with Replacement Sheet 8. (amended Fig. 4) included herewith.

Fig. 4 has been amended to include exemplary pairs of electrodes disposed on the docking station as recited in claim 67.

REMARKS

Claims 1-67 are pending in the present application. Claims 5, 6, 7, 9, 10, 11, 12, 17, 24, 28, 40, 41, 44, 46, 49, 50, 52, 53, 54, 56-59, 64, 65 and 66 are amended herein. Claim 66 has been cancelled, without prejudice. New claims 68-71 are added herein. Accordingly, claims 1-65 and 67-71 will be pending upon entry of the instant amendments.

Support for the amended claims can be found throughout the specification and encompassed by the scope of the claims as originally filed. In particular, the amendments to the claims are further explained below. Support for the amendment to claim 50 can be found, at least, for example, on page 29, lines 29-30. Support for the new claim 68 can be found, at least, for example, on page 13, lines 22-29, and Fig. 1C. Support for the new claim 69 can be found, at least, for example, on page 18, lines 24-25. Support for the new claim 70 can be found, at least, for example, on page 10, lines 20-22, and page 13, lines 16-22. Support for the new claim 71 can be found, at least, for example, in Figs. 12 and 13. No new matter has been added.

Any amendments to the claims should in no way be construed as acquiescence to any of the Examiner's rejections and were done solely to expedite the prosecution of the application. Applicant reserves the right to pursue the claims as originally filed in this or a separate application(s).

Allowable Subject Matter

Applicants gratefully acknowledge that claims 1-4, 13-16, 32-39 and 67 are allowed. Additionally, claims 5-12 and 17-32 would be allowable if rewritten to overcome the 35 U.S.C. §112, second paragraph, rejections.

Claims 44, 46, 47 and 49 would also be allowable if rewritten to overcome the objection as being dependent on a rejected base claim. Accordingly, claims 44, 46, 47 and 49 are amended herein, incorporating the limitations of the base claim, rendering them to have allowable subject matter.

Drawings

The drawings were objected to for failing to show every feature of the invention specified in the claims. Fig. 4 has been amended to show pairs of electrodes disposed on the docking station as recited in claim 67. No new matter has been added.

Claim Rejections - 35 U.S.C. §112

Claims 5-12, 17-31, 41, 50-59 and 60-66 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Applicants respectfully traverse the foregoing rejection.

With regard to claim 5, claim 5 was amended herein to depend from an appropriate base claim thereby overcoming the rejection.

The "said pipette" in claim 6 does refer to the microfluidic pipette in the base claim. But for clarity, Applicants amended claim 6 to recite "said microfluidic pipette" thereby overcoming the rejection.

Claim 7 was amended to recite "additional" detector modules as suggested by the Examiner thereby overcoming the rejection.

Claim 9 was appropriately amended thereby overcoming the rejection.

With regard to claim 10, the Examiner objects to "a removable cartridge component" by querying what is it removable from. While the specification plainly describes on page 11, lines 4-11, and as shown in, e.g., Figs. 6-7B, that the detector module of the

invention comprises an upper housing 104 and a removable cartridge 102, in which the cartridge 102 is removable from its associated upper housing 104 of the entire cartridge, Applicants appropriately amended the claims thereby overcoming the rejection.

With respect to claims 11-12, Applicants have appropriately amended the claim thereby overcoming the rejection.

Claim 17 is amended to delete the term "working" thereby overcoming the rejection.

Claims 24, 28, 41 and 50 are amended to overcome the §112, second paragraph, rejections.

With regard to claim 53, Applicants submit that an "input excitation light path" is a sufficient structural limitation and reconsideration is respectfully requested. In response to the Examiner's request to recite a light source, note that the light source itself is external to the detector module. Moreover, the "collection optical axis" is also part of the structure of the collection optical assembly in the detector module.

Regarding claim 54, the term "an angle of light collection from the capillary" has been amended to read "an amount of light collection" for clarity. Note, for example, page 29, lines 8-31, of the specification. In order to maximize the signal-to-noise level of the detector, the light source should be configured in such a way to maximize the amount of light emitted and collected.

The remaining claims have been amended to overcome the Examiner's indefiniteness rejections and to render them clear and definite.

Claim Rejections - 35 U.S.C. §103

Claims 40, 41, 43, 45 and 48 are rejected under 35 U.S.C. §103(a) as being obvious over Burolla et al. in view of

Zimmermann. Claims 40, 42 and 53 are rejected under 35 U.S.C. §103(a) as being unpatentable over Burolla et al. in view of Weinberger et al.

Applicants respectfully traverse the foregoing rejection.

The presently amended claim 40 is directed to a detector module for use with a capillary electrophoresis system comprising a housing that comprises an upper housing and a cartridge that is removably mounted to the upper housing, a channel disposed through the housing, the channel comprising an inlet end extending through the cartridge, an outlet end extending through the cartridge, and a midportion of the channel extending along an upper surface of the cartridge from the inlet end to the outlet end. A capillary is disposed in the channel in the housing and extends from the inlet end to the outlet end. A first electrode extends through and depends from at least the cartridge of the housing in association with the capillary at the inlet end and a second electrode extends through and depends from at least the cartridge of the housing in association with the capillary at the outlet end. In addition, a detector is disposed in alignment with a portion of the capillary. The remaining rejected claims 41-43, 45, 48, 50, and 53-60 are dependent on the base claim 40.

Applicants assert that the subject matter encompassed in claim 40 and claims 41, 42, 43, 45, 48, 50, and 53-60 (respective dependent claims to claim 40) is not obvious and patentably distinct over the cited art, either alone or in combination.

The present invention is structurally distinguishable from Burolla et al., which this cited reference cannot make the present invention obvious. Burolla et al. fails to teach or suggest an entire capillary electrophoresis analysis system that is designed into a single detector module. Burolla et al. is distinguishable

from the present invention in that it teaches one solid unit or cartridge for merely holding a capillary for electrophoresis. Burolla et al. is silent with respect to any suggestion for integrating an entire detecting system that is disposed in alignment with a portion of a capillary. Burolla et al. is also silent with respect to the capillary housing that comprises a single channel for supporting a capillary and a separate inlet and outlet end extending through the cartridge. Moreover, Burolla et al. fails to teach or suggest providing electrodes that extends through and depend from at least the cartridge at both the inlet and outlet end. Burolla et al. merely provides a capillary cartridge housing that is separate from any detection system and without any other features integrated into its cartridge as claimed in the present invention.

The present invention is unique in that the detector module as represented in claim 40 and its respective dependent claims is designed for high throughput analysis system that is miniature, light-weight and portable coupled with an integrated capillary electrophoresis detection system. One of ordinary skill in the art would appreciate that the present invention required extensive experimentation, time, effort and skill to come up with the combined features of the present invention. Burolla et al. cannot make the invention obvious.

Zimmerman fails to cure the deficiencies found in Burolla et al. Similar to Burolla et al., Zimmerman also teaches a capillary cartridge that is separate from any detection system. Additionally, Zimmerman teaches an "electrode tube 39" that does not extend through the cartridge as it does in the present invention. Either alone or in combination, Zimmerman fails to teach or suggest the claimed invention.

Weinberger et al. also fails to cure the deficiencies found in Burolla et al. because Weinberger et al. does not teach or suggest the claimed combination. The cartridge described in Weinberger et al. primarily holds a capillary to be placed into a separate detection unit. Weinberger et al. fails to teach or suggest a detector integrated and disposed in alignment with a portion of the capillary in the capillary module of the present invention. Weinberger et al. merely provides a spherical lens holder in its cartridge. Additionally, the electrodes in Weinberger et al. do not extend through and into a cartridge at both the inlet and outlet ends. It appears that the electrodes (based on Fig. 4 in the '382 patent) in this cited art are external from its cartridge.

None of the cited references, either alone or in combination, teaches or suggests all of the limitations in the claim. With the commercial availability of detectors and separate capillary cartridges, no requisite motivation can be gleaned from the cited references to come up with the invention successfully. Accordingly, claim 40 and the claims dependent therefrom are believed to be patentable over Burolla et al. in view of Zimmerman or Weinberger et al.

Claim 50 is rejected under 35 U.S.C. §103(a) as being unpatentable over Burolla et al. in view of Weinberger et al. as applied to claim 42, and further in view of Merenkova et al. or Yeung et al. or Melman et al.

With respect to claim 50, Applicants claimed invention further comprises an input optical fiber that is disposed to transmit light from a laser source having a termination adjacent the capillary disposed on the channel to direct light through the

capillary at an acute angle to an axis of the capillary and wherein the excitation light from the capillary is approximately 90 degrees to the detector. As argued above, Burolla et al. and Weinberger et al., either alone or in combination, fail to teach or suggest the claimed invention. Merenkova et al. also fails to cure the deficiencies of the claimed invention. As described by the Examiner, Merenkova et al. teaches that the angle between the illuminating light beam and the axis of light collecting objective is advantageously approximately 45 degrees. In the presently claimed invention, the angle of illumination is approximately 90 degrees with the axis of the light collection assembly of the invention. There is no teaching or suggestion, or the requisite motivation, in Merenkova et al. to provide an orthogonal angle between the illumination and the axis of the light collection assembly as being advantageous or even to suggest the capability of coming up with such a positioning.

Similarly, both Yeung et al. and Melman et al. fail to teach or suggest the advantage of having the illumination at an orthogonal angle to the axis of the light collection assembly. Both Yeung et al. and Melman et al. teach an angle of illumination with the axis of the capillary to be perpendicular thereby generating a 45 degree angle of illumination with the axis of light collecting objective. Applicants respectfully request reconsideration and withdrawal of the foregoing rejections.

Claims 54 and 55 are rejected under 35 U.S.C. §103(a) as being unpatentable over Burolla et al. in view of Weinberger et al. as applied to claim 42 and 53, and further in view of Stewart. Claim 56 is rejected over Burolla et al. in view of Weinberger et al. as applied to claims 42 and 53, and further in view of Shear

et al. These claims are believed to be patentable for the reasons set forth above with respect to claim 40, and accordingly, no further comment thereon is believed to be necessary at this time.

Claim 57 is rejected under 35 U.S.C. §103(a) as being unpatentable over Burolla et al. in view of Weinberger et al. as applied to claims 42 and 53, and further in view of Yeung et al. These claims are believed to be patentable for the reasons set forth above with respect to claim 40, and accordingly, no further comment thereon is believed to be necessary at this time.

Claims 58 and 59 are rejected under 35 U.S.C. §103(a) as being unpatentable over Burolla et al. in view of Weinberger et al. as applied to claim 42 and 53, and further in view of either Stewart or Eriksson et al. Claim 60 is rejected under 35 U.S.C. §103(a) as being unpatentable over Burolla et al. in view of either Zimmermann to claim 41 above, and further in view of Carver. These claims are believed to be patentable for the reasons set forth above with respect to claim 40, and accordingly, no further comment thereon is believed to be necessary at this time.


CONCLUSION

Based on the foregoing, entry of the amendments and remarks presented herein, reconsideration and withdrawal of all the rejections and allowance of application with all pending claims are respectfully requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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